

Government Aerospace Affairs Forum

Tuesday, December 11, 2018

United launch Alliance

Galileo Building, 9501 East Panorama Circle, Centennial, CO 80112

PROGRAM

8:30 – 09:00	Arrival and networking
9:00	Welcome – John Elbon, COO, United Launch Alliance
9:05	Session Overview Maj. Gen. Jay Lindell, Aerospace & Defense Industry Champion OEDIT
9:15	Congressional staff introductions and member updates – Congressional Staff
9:30	Panel 1: Legislative Support for National Security Space in Colorado Moderated by: Maj. Gen. Jay Lindell, OEDIT Panelists: <ul style="list-style-type: none">Rich Burchfield, Chief Defense Development Officer, CO Springs Chamber & EDCDave Eddy, Boeing Colorado Site DirectorEric Hansen, Sr. Mgr. Mission Engagement, Lockheed Martin SpaceMike Traxler, Program Manager, Office of Industry Collaboration, Research & Innovation Office, CU BoulderBrigadier General Gregory White, Director of Joint Staff, Air National Guard Assistant to the Director of Operations and Communications, Air Force Space Command
10:30	Break

10:40	Panel 2: Legislative Support for Civil and Commercial Space in Colorado Moderated by: Dr. Ron Sega Director and Woodward Professor of Systems Engineering at Colorado State University/Colorado Space Coalition Co-Chair Panelists: <ul style="list-style-type: none"> ▪ Mike Gazarik, VP Engineering, Ball Aerospace ▪ Maureen O'Brien, CEO, Oakman Aerospace ▪ John Reed, Chief Technologist of Advanced Programs, United Launch Alliance ▪ Dirk Wallinger, CEO, York Space Systems
11:45	Lunch
12:00-12:45	Remarks from Tory Bruno, President & CEO, United launch Alliance <i>Followed by Q&A</i>
1:00	Special Topic Presentations <ul style="list-style-type: none"> • Aerospace Trends, Future Challenges Mark Sirangelo, University of Colorado at Boulder, Entrepreneur-In-Residence • MD5: The National Security Technology Accelerator Rachel Cheetham, Rocky Mountain Regional Director • Dream Chaser Update John Curry, former NASA flight director & current Sr. Director of Programs for the Dream Chaser CRS-2 missions • Colorado Space Grant Consortium Chris Koehler, Director
2:20	Session Wrap-Up and Closing Comments – Maj. Gen. Jay Lindell
2:30	United Launch Alliance Mission Control Center Tour (Optional) – <i>subject to availability</i>
3:00	End of Program

Background on Panel Briefing Topics

Each panel will provide industry perspectives on a range of issues relating to current and upcoming congressional asks, in addition to insights into industry trends and developments, as they relate to Colorado's aerospace industry landscape

Panel 1: Legislative Support for National Security Space

National Security Space includes all military and intelligence community uses of space-based capabilities, such as threat detection, military weather forecasting, and reconnaissance activities. The U.S. Air Force is the Defense Department's Executive Agent for Space, providing and acquiring critical capabilities and services to national leadership and all branches – from secure communications to precision navigation, timing, and targeting. The National Reconnaissance Office provides a similar function for the intelligence community. Other agencies involved include the Defense Advanced Research Projects Agency and the National Geospatial-Intelligence Agency.

Issue 1: Support Department of Defense proposed initiatives to reform national security space architecture.

The President has directed “the Department of Defense and Pentagon to immediately begin the process necessary to establish a Space Force as the sixth branch of the Armed Forces” that is separate from and equal to other branches. In response to the President’s direction, the Department of Defense has outlined steps to protect U.S. vital interests in space and start the process to comply with the President’s direction.

GAAF Recommendations:

- Regardless of the direction that is taken by the Administration, space capability for our nation needs a lean, agile organizational architecture that is integrated with the intelligence community, funded appropriately, with clear authority to unify all national security space related agencies to develop policy, budget requirements, acquire capability, train space defense professionals, and employ space capability against threats to our nation.

- Support Department of Defense initiatives that reform organizations and processes that will lead to more effective, efficient, and less cost and time to acquire needed national security space capability.

Issue 2: The Department of Defense has been directed to form a new unified combatant command, U.S. Space Command, responsible for preparing for and deterring conflict in space and leading U.S. forces in that fight if it should happen. The location of the Command has not been decided; however, Colorado Springs is a fantastic location!

U.S. Space Command will have the responsibility to lead U.S. defense activities in space and establish unity of command for operational space forces, integrate space planning and operations across military campaigns and contingency plans, and develop space doctrine, concepts of operation and space tactics, techniques and procedures, and to utilize commercial practices and digitization to streamline the footprint and automate labor-intensive operations.

- Colorado is the U.S. epicenter for national security space. The state is home to a diverse mix of U.S. Department of Defense (DoD) military installations and major command centers that foster important synergies between private aerospace companies and government entities.
- Major installations include Buckley Air Force Base, Peterson Air Force Base, Cheyenne Mountain Air Force Station, Schriever Air Force Base, U.S. Air Force Academy, and Fort Carson with over 28,000 Army personnel.
- Colorado has deep ties to the Department of Defense and immense patriotic commitment to providing for the nation's security. The State significantly values the defense installations in Colorado and recognizes that Department of Defense generates 8% of the State's totally economy in terms of employment, earnings, and state tax revenues. The annual defense economic impact to Colorado is \$36.6 billion with home to more than 170,000 military and defense-related civilian personnel, or 5.2 percent of the state's workforce.
- Colorado is a great place for national security space. As stated by Governor Hickenlooper, "We are fortunate to host several key missions that are critical to the daily security that we enjoy as Americans. Colorado is a community that truly supports our military."

GAAF Recommendation:

- If DoD decides to form a new unified combatant command, US Space Command, Colorado Springs an ideal location. The infrastructure to include basing of the US Air Force Space Command, space system operations centers, the National Space Defense Center, trained personnel, and community as well as State support make Colorado Springs an ideal location.

Issue 3: Continued Commitment to United Launch Alliance (ULA) Development of the Vulcan Centaur launch vehicle.

ULA is a proven and reliable launch provider for the Dept of Defense and has launched 130 missions, with 100 percent success. ULA's next generation for DoD launch services is the Vulcan Centaur. Vulcan Centaur is under development and will surpass current ULA current rocket capabilities and launch services at significantly lower costs, while still meeting the requirements of ULA's cooperative research and development agreement with the U.S. Air Force to certify the Vulcan Centaur for national security space missions and assured access to space.

- The Vulcan Centaur is making strong progress in development and is on track for its initial flight in mid-2020. The Vulcan Centaur rocket design leverages the proven success of the Delta IV and Atlas V launch vehicles while introducing advanced technologies and innovative features. The new rocket will be superior in reliability, cost and capability, a single system for all launch missions.
- Vulcan Centaur will bolster U.S. manufacturing by adding to the more than 22,000 direct and indirect American jobs in 46 states supported by ULA programs.

GAAF Recommendation:

- Continued budget commitment to support development of the Vulcan Centaur launch system to ensure ULA is a certified and competitive launch provider for DoD payloads.

Issue 4: Continue Strong Support For The Global Positioning System (GPS) III And Operational Control (OCX) Segment Programs.

The most powerful GPS satellites ever designed and built for the U.S. Air Force, are produced by Lockheed Martin Space Systems, Littleton, Colorado. Recently, the U.S. Air Force announced selection of Lockheed Martin for a fixed-price-type production contract for the final 22 GPS III follow-on satellites. Lockheed Martin's GPS III satellites will have three times better accuracy and up to eight times improved anti-jamming capabilities. Spacecraft life will extend to 15 years, 25 percent longer than the newest GPS satellites on-orbit today. GPS III's new civil signal also will make it the first GPS satellite broadcasting a compatible signal with other international global navigation satellite systems, like Galileo, improving connectivity for civilian users. The first GPS III satellite is expected to launch December 15th, 2018.

Additionally, all future Lockheed Martin GPS III satellites have validated compatibility with the next generation Operational Control System (OCX) and the existing GPS constellation, significantly mitigating risks from adding GPS III to the constellation. Raytheon is developing the OCX system for GPS III.

GPS underpins our economy and national security. There are over 2 billion GPS receivers in use around the world, a number that Europe's satellite navigation agency estimates will hit 7 billion by 2022. Along with the telecommunications industry, banks, airlines, electric utilities, cloud computing businesses, and TV broadcasters require constantly precise GPS timing. The U.S. Department of Homeland Security has designated 16 sectors of infrastructure as "critical," and 14 of them depend on GPS.

GAAF Recommendation:

- Continued Congressional commitment to the funding of the DoD GPS III program to ensure continued modernization of the GPS system and the production and fielding of all 32 satellites for the GPS III constellation.

Issue 5: The Air Force has released a notice of intent to sole source to Lockheed Martin and Northrop Grumman for the next-generation overhead persistent infrared program (OPIR). The five-satellite next-generation OPIR will succeed the current Space Based Infrared System. The Air Force wants a new system that is more survivable against emerging threats.

- The Air Force said it is implementing "rapid procurement authorities" and is targeting the first next-generation OPIR launch in 2023.
- As part of rapid procurement, the Air Force is implementing sole source contracts to Lockheed Martin Corporation (LMC) and Northrop Grumman Corporation (NGC). LMC will be responsible for three geosynchronous orbit satellites and NGC for two polar orbit satellites.
- The Air Force's goal is to have a new constellation in five years. A 2023 launch is the target for the first geosynchronous satellite. The first polar orbit satellite would launch in 2027. The entire system, would be on orbit by 2029.
- The Air Force informed Congress that it wanted to end the procurement of LMC SBIRS satellites after vehicle 6 and shift the funds previously allocated for SBIRS 7 and 8 to develop the new OPIR system.
- OPIR acquisition will be a "pacesetter" for learning to speed up traditional acquisitions. Developing, producing and launching into orbit a new constellation in five years is aggressive and will a "switch in the mindset" of procurement managers to balance the need to deliver on time with a reasonable amount of experimentation and prototyping.
- Lockheed is the sole producer of Air Force-validated nuclear hardened spacecraft that can meet government requirements and urgent need dates as stated by the Space and Missile Center Remote Sensing Directorate.

GAAF Recommendation:

- Support the Air Force decision to cancel SBIRS 7 and 8 and support OPIR sole source acquisition of next generation OPIR capability for 2023 planned first launch date.

Issue 6: The process by which the federal government vets prospective employees and clears them to handle sensitive government information has resulted in extreme delays and backlog in clearance decisions for aerospace employees. Currently there are approximately a backlog of 600,000 open background investigations with process taking an average of 1.5 – 2 years.

- As of July 2018, (ClearanceJobs.com, Jul 18, 2018) security clearance processing times for defense contractors are 543 days. Secret clearance processing times are 259 days. Top Secret reinvestigation clearance processing times are now taking 697 days to process the fastest 90 percent of Top Secret reinvestigations. Top Secret reinvestigations aren't even being submitted until the six-year mark, slowing processing times mean the majority of Top Secret clearance investigations are close to 8 years old.
- Sue Gordon, principal deputy director of national intelligence, described the current security clearance process as in a state of crisis.
- The security clearance backlog has been an issue that has plagued successive administrations. In January this year, the Government Accountability Office added the federal security screening process to its "high risk list" of government systems in need of significant reform.
- The extensive delays for security clearances for new employees is a major impact for Colorado aerospace business and research institutions. The delays have contributed to workforce shortages and many talented and skilled people seeking jobs in non-aerospace and defense industry careers that will not return for an exciting aerospace career.
- Sen. Mark Warner, D-Va., Vice Chairman Senate Intelligence Committee, introduced provisions to the annual Intel Authorization Act designed to reform and strengthen. One provision would set a goal of processing 90 percent of "secret" clearance requests within 30 days and 90 percent of "top secret" requests within 90 days.

GAAF Recommendation:

- The intelligence community is working to construct an "enhanced security framework" that will set government-wide standards for agencies to follow when conducting background investigations into prospective employees. Support policy, legislation and funding as appropriate for investigative agencies to reduce the security clearance process to a reasonable amount time for a security clearance. Many businesses advocate for a 90-day process for a new security clearance.

Panel 2: Legislative Support for Civil and Commercial Space

The Civil Space Sector encompasses non-defense government space activities, the majority of which are led by the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA). NASA programs focus on advancing understanding of the Earth, solar system and universe, space exploration, and researching and developing aeronautics and space technologies. NOAA's Satellite and Information Service manages the Nation's operational environmental satellites and provides global environmental data from satellites and other sources to monitor and understand the Earth. Civil Space also includes activities in partnership with education and research institutions, and international partners.

The Commercial Space Sector covers a spectrum of space business activity. It includes provision of goods or services by private sector entities to primarily other private sector entities or consumers rather than to the government (e.g. satellite television, radio and internet service providers). It also includes the sale of consumer products which are reliant on government-owned systems (e.g. GPS). Commercial space enterprise also encompasses provision of products and services to primarily government customers in the civil and national security space sectors, where the company bears a reasonable portion of the investment risk and responsibility for the activity. The government plays a major role in commercial space activities by establishing regulatory policy, creating policy directing government agencies to purchase services from companies, and encouraging public-private partnerships where risk and reward are shared.

Issue 1: Commit to return of U.S. human spaceflight capabilities and support Colorado's leading role in the nation's space exploration and science missions

Sustained focus, process, and funding is required to ensure the U.S. regains human spaceflight capabilities and retains its leadership in space. Colorado's aerospace industry competes for work across all of NASA's portfolio, is at the forefront of future spaceflight development and launch capabilities, and plays a leading role in many of NASA's most ambitious space science endeavors. Such missions and programs are critical for advancing and maturing valuable technology.

- The Lockheed Martin-built Orion Multi-Purpose Crew Vehicle, the world's first spacecraft designed for long-duration, human-rated missions, has already successfully flown its first test mission in orbit. The Space Launch System (SLS), the most powerful rocket ever built, is scheduled to fly for the first time in 2020, with Longmont-based EnerSys providing battery power to critical systems on the vehicle. Orion will resume human exploration beyond low Earth orbit with its first crewed mission, launched by the new SLS, scheduled for 2021/22.
- United launch Alliance has launched more than 130 consecutive and successful, science, exploration and national security missions. Through its existing launch fleet, and forthcoming Vulcan Centaur, ULA is supporting NASA and its partners in developing capabilities to deliver American astronauts to low Earth orbit, the moon and beyond.
- Lockheed Martin built the Mars lander spacecraft for NASA's InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) mission to Mars, which also incorporates critical hardware developed by Sierra Nevada Corporation. Lockheed Martin is also building the aeroshell and heat shield which will protect the Mars 2020 Rover on its journey to Mars, with Sierra Nevada Corporation again providing critical hardware for the Mars 2020 rover's two-year mission to explore the surface of Mars.
- Ball Aerospace designed and built the advanced optical technology and lightweight mirror system for the James Webb Space Telescope (JWST), the successor to the Hubble Space Telescope. JWST is scheduled for launch in 2021, and will be the most powerful space telescope ever built, orbiting the earth one million miles from Earth, and able to detect the light from the first galaxies ever formed and explore planets around distant stars.
- The President's Space Policy Directive 1 directs NASA to work with commercial and international partners on a program of human exploration efforts to the moon, and eventually to Mars. In addition to its role in human exploration goals, cislunar space (the orbital area near the moon) is a future economic resource, with enormous potential to enable science, manufacturing and mining activities beyond Earth. NASA will establish the Lunar Orbital Platform-Gateway to achieve the architecture necessary for cislunar operations, access to the surface of the moon, and first step in future human missions to Mars.
- Given the need for sustained, long-term, technology and budget planning for a human mission to Mars, "Mars 2033" is a goal of launching humans to Mars in 2033 to take advantage of a low energy launch window for a year-and-a-half round trip instead of the normal two or three-year journey. The likelihood of mission success is much improved with a shorter mission, with the added advantage of less exposure to radiation, solar flares and the effects of zero gravity for astronauts. We commend Congressman Ed Perlmutter for being a long-standing champion of the Mars 2033 goal.

GAAF Recommendations:

- Advance the nation's cislunar and human deep-space exploration capabilities by ensuring the Orion spacecraft and Space Launch System (SLS) programs remain fully funded.

- Support the launching of U.S. astronauts aboard U.S. launch vehicles and spacecraft, and ensure commercial providers make human safety their number one priority by following best practices developed over decades by NASA and other space agencies.
- Continue funding support for Mars 2020 mission and James Webb Space Telescope.
- Support continued space exploration efforts through the expansion of the NASA Science Mission Directorate's existing flight projects and research and analysis programs.

Issue 2: Support industry collaboration and public private partnerships to advance civil space programs and grow the commercial space sector

Expanding market opportunities for the commercial space sector is key for ensuring future space industry growth. NASA's strategy includes stimulating the commercial space industry to help the agency achieve its goals and objectives for expanding the frontiers of knowledge, capability, and opportunities in space. The benefits of this approach include leveraging private investment, advancing the nation's space capabilities, and paving the way for new economic markets.

- NASA's Commercial Crew Development (CCDev) program has succeeded in stimulating an exceptional renaissance of space launch, spacecraft, space operations, and space commerce capabilities – at a lower cost than historical programs. In 2016 NASA awarded Sierra Nevada Corporation a Commercial Resupply Services 2 contract to deliver cargo and scientific research to the International Space Station (ISS), as well return and disposal services for at least six missions through 2024, using SNC's Dream Chaser spacecraft. United Launch Alliance will launch Boeing's Crew Space Transportation (CST)-100 Starliner spacecraft currently being developed in collaboration with NASA's Commercial Crew Program.
- The International Space Station is one of the most ambitious and successful international collaborations in history. As a designated U.S. National Laboratory, the ISS provides access to the space environment and is a critical microgravity research platform for U.S. space companies, researchers and students. BioServe Space Technologies is a Center within the Aerospace Engineering and Sciences Department at the University of Colorado Boulder, and has had a permanent research presence on the ISS since 2002. Colorado companies Oakman Aerospace and Teledyne Brown Engineering partnered on the Multi-User System for Earth Sensing (MUSES) which is currently operating aboard the ISS and is the first commercially operated remote sensing hosted payload platform.
- NASA's Next Space Technologies Exploration Partnership (NextSTEP) is a public-private partnership model that seeks commercial development of deep space exploration capabilities to support more extensive human spaceflight missions around and beyond cislunar space—the space near Earth that extends just beyond the moon. A key component of the NextSTEP partnership model is that it provides an opportunity for NASA and industry to partner to develop capabilities that meet NASA human space exploration objectives while also supporting industry commercialization plans. NASA selected Sierra Nevada Corporation and Lockheed Martin Space Systems among six companies to design

ground prototypes and concepts for deep space habitats on Mars as part of the NextSTEP-2 program.

- Lockheed Martin Space Systems and Deep Space Systems were among nine companies selected by NASA to bid on NASA's Commercial Lunar Payload Services (CLPS) contracts as part of the agency's Moon to Mars Exploration Campaign. NASA will buy commercial landing services on future commercial landers carrying science and technology payloads from Earth to the surface of the Moon. The combined maximum contract value is \$2.6 billion over the next 10 years, with contracted missions beginning as early as 2019.

GAAF Recommendations:

- Continue funding for Commercial Cargo Resupply contracts, and Commercial Crew Transportation Capabilities contracts.
- Support the continued operation of the International Space Station through at least 2024.
- Continue funding support for NASA's NextSTEP-2 and CLPS programs.

Issue 3: Protect national capabilities in Space and Earth Weather Prediction, Earth Science, Early Warning Systems, and Environmental Intelligence

Strong investment by NASA and NOAA in atmospheric research and weather prediction is important to both the nation and Colorado. Earth science programs heavily utilize the type of small mission capabilities, including launch and support functions, at which Colorado's aerospace industry excels. NASA's Science Mission Directorate, which includes Earth Science, Planetary Science, Astrophysics, and Heliophysics, plays an essential role in meeting the growing challenges to fully understand global changes to the Earth - presenting opportunities for Colorado's research institutions, while also fueling the talent pipeline.

- NOAA's Joint Polar Satellite System (JPSS) and Polar Follow On (PFO) will replace current polar-orbiting satellites and operate through 2038. The U.S. experiences more severe weather events than any other nation on Earth (due to our population density and developed infrastructure), and JPSS provides critical input to advance forecasts of the most dangerous and damaging weather. Ball Aerospace designed, built and tested the JPSS-1 satellite, successfully launched in 2017, and is under contract to provide the Ozone Mapping and Profiler Suite-Nadir (OMPS) instruments on NOAA's follow-on JPSS-2, JPSS-3 and JPSS-4 satellites (currently on hold as plans for the Polar Follow-On program are revisited).
- The Geostationary Operational Environmental Satellite system (GOES) is operated by NOAA's National Environmental Satellite, Data, and Information Service division, and supports weather forecasting, severe storm tracking, and meteorology research. The GOES next generation of weather satellites are being built by Lockheed Martin and will operate through 2036. Two are successfully on orbit, and the remaining two (GEOS-T and GOES-U) will also be built by Lockheed Martin. With significantly enhanced capabilities, and together

with JPSS, these satellites will greatly improve the accuracy and extend the warning times for thunderstorms and tornados across the country, saving lives and protecting commerce.

- NOAA and the U.S. Air Force will launch the first six satellites of the Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC-2) constellation, and will provide precision radio occultation soundings to support improved numerical weather prediction model forecasts, and also include space weather payloads to benefit research and operational communities, including the U.S. Air Force. The research that made this operational constellation possible was conducted by Boulder-based University Corporation for Atmospheric Research (UCAR).
- The Landsat program is a partnership between NASA and the U.S. Geological Survey and has delivered more than four decades of continuous space-based, moderate-resolution, land remote sensing data — data critical to providing key information about the world's food, forests, and water, and how these and other resources are being utilized. The next satellite in the series, Landsat 9 is being built by NASA and industry, with Ball Aerospace building the Operation Land Imager. A timely Landsat 9 launch is critical to ensure continuity in the 45-year data record of the Earth's surface.
- The Space Weather Research and Forecasting Act to coordinate the development and implementation of federal government activities to improve the nation's ability to prepare, avoid, mitigate, respond to, and recover from potentially devastating impacts of space weather events. The ability to understand and predict space weather events is also critical to the success of future Mars missions because of the risks they pose to spacecraft crew during transit. We commend Senator Cory Gardner for sponsoring S. 141, the Space Weather Research and Forecasting Act, and Representative Ed Perlmutter for introducing a companion bill in the House.

GAAF Recommendations:

- Support funding and full deployment of JPSS and GOES, and COSMIC-2 programs.
- Fund Landsat 9 at the recommended FY2019 level to support a 2020/21 launch.
- Support S.141 and House companion bill.

Issue 4: We recommend promoting and advancing Colorado aerospace through participation in the following Congressional committees and caucuses, with priority given to Appropriations Committees.

Participation in these forums helps promote and advance support for aerospace and gain visibility for Colorado's leadership in this industry. Colorado aerospace represents a uniquely integrative view of the civil, commercial and defense space sectors, and our congressional delegation is ideally situated to champion the national space ecosystem's many assets and opportunities. We thank Colorado's delegation members for their current participation in a

number of these caucuses and committees, and request consideration of those which do not have representation from Colorado.

Senate:

Senate Appropriations Committee

- Subcommittee on Defense
- Subcommittee on Commerce, Justice and Science and Related Agencies

Senate Committee on Armed Services

Senate Select Committee on Intelligence

Senate Committee on Commerce, Science & Transportation

- Subcommittee on Science and Space
- Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard
- Subcommittee on Communications, Technology, and the Internet
- Subcommittee on Aviation Operations, Safety, and Security

Senate Aerospace Caucus

Senate Science and Technology Caucus

Senate Unmanned Aerial Systems (UAS) Caucus

House:

House Appropriations Committee

- Subcommittee on Commerce, Justice and Science and Related Agencies
- Subcommittee on Defense

House Committee on Armed Services

House Permanent Select Committee on Intelligence

House Committee on Science, Space and Technology

House Aerospace Caucus

House Space Power Caucus

House Research and Development Caucus

House Science and National Laboratories Caucus

House Defense Communities Caucus

The Congressional Unmanned Systems Caucus

Issue 5: Support growth of Colorado's commercial space sector by continuing the effort to reduce unnecessary licensing and export restrictions

Export controls create unintended consequences due to the broad and vague nature of the ITAR and EAR regulations and the lengthy processing time. We applaud the efforts of Senator Bennet and Congressman Coffman in advancing satellite export control reform through the FY 2013 National Defense Authorization Act, and request the delegation continue to work on meaningful changes/reforms of the ITAR, including transfers of items from the United States Munitions List to the Commerce Control List, to ensure U.S. companies are globally competitive.

- International interest in purchasing U.S.-produced space components suffers due to the unpredictable licensing process, which hampers U.S. competitiveness. In turn, it forces international governments and companies to purchase or develop foreign-produced technology, thereby reducing U.S. security, rather than enhancing it.
- U.S. universities are unable to attract top international graduate students to work on research that is covered by ITAR restrictions, limiting their ability to develop the next generation of technology. Current policy also prevents the United States from retaining the talent of such science and engineering professionals, and the restrictions also limit the ability of U.S. students to gain the cutting-edge space-research experience that their counterparts in Europe and Asia benefit from, undermining the global competitiveness of U.S. companies.
- Restrictive limitations on international participation in human spaceflight need to be addressed in the ongoing reform efforts. As the United States regains its status as a provider and innovator in human spaceflight, continued attention to export reform regulations will ensure projects can secure partnerships with like-minded nations around the globe to advance the technological growth and economic security of the U.S. industrial base.
- Ongoing industry input on Export Control Reforms is vital for capturing valuable insight into what technologies are already available throughout rest of world.

GAAF Recommendations:

- Support and encourage continued administrative changes to International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR) to increase U.S. security and competitiveness, including the export control reform legislation for commercial satellites enacted in the FY2013 Defense Authorization bill.
- Remove noncritical areas where ITAR control is not necessary in order to focus security protections without creating barriers to commerce and research.
- Work with the U.S. Department of State to pursue a statutory exemption for exports of space related items to U.S. allies, such as North Atlantic Treaty Organization (NATO) countries.
- Work with the U.S. Department of Commerce to promote export sales of U.S. space components, products, and services.

Issue 6: Support acquisition policies and regulatory frameworks that promote continued growth of Colorado's small satellite industry.

Satellite-based operations and manufacturing combined are one of the fastest growing sectors of Colorado's space economy. Development and use of small satellites (generally weighing less than 1,100lbs) continues to grow to meet military, civilian and commercial remote sensing needs. While there are limitations to small satellite capabilities, their benefits include lower costs, responsiveness and flexibility, speed to orbit, enhanced resiliency of space capabilities to ensure the performance of critical missions, new opportunities for space mission performance,

and potential for broader and more continuous coverage from space. Colorado companies and research institutions are at the forefront of small satellite research, development, manufacturing, and technology commercialization.

- Rapid Responsive Launch Capability involves setting up a framework to shorten the integration process required to launch a spacecraft, and developing a responsive space model that offers rapid, repeatable access to orbit. Currently, typical mission integration campaigns can take many months of developing and verifying requirements, in addition to the time required for regulatory approvals. Creating a standard launch integration product that has pre-established compatibility with the satellite product can significantly reduce mission integration time, and time to launch. Rapid Responsive Launch capability supports and encourages further commercial space growth by making small satellite launches and remote sensing activities more affordable, accessible, and open to adoption by adjacent industries (e.g. oil and gas, agriculture).

GAAF Recommendation:

- Ensure factors enabling continued growth of the small satellite economy are appropriately considered in all phases of space acquisition and operations for the U.S. government.